



ECBC 2003

EDGEWOOD CHEMICAL BIOLOGICAL CENTER

Message from the Technical Director



During FY03, the United States was heavily engaged in the global war on terror. Our warfighters operated in harm's way across Afghanistan and Iraq. On the home front, our country continued its work to counter the threat of terrorism. This was a year when the Department of Defense's science and engineering infrastructure was called upon to respond. It was a year of major accomplishment by the people of the Edgewood Chemical Biological Center in response to that call.

With this in mind, I am proud to present the FY03 ECBC Annual Report to our customers, stakeholders, and workforce. This year has been an outstanding one for the Center in terms of technical accomplishment. We transitioned valuable products like the improved M12A1 large-area decontamination device to the warfighter and ushered novel technologies, like the Automated Biological Agent Testing System (ABATS), into operation at critical domestic sites. We continued to leverage our chemical and biological defense expertise to provide unique services at our Edgewood campus and in the field for the Joint Services and the intelligence community.

As you will note in the report, in FY03 we completed our fifth consecutive year of increased staffing and revenues and were recognized multiple times for our innovative products and excellence in technology transfer. I am also pleased to mention that we broke ground for our new \$44 million Advanced Chemistry Laboratory and began the design of the future Chemical Biological Radiological Sample Receipt Facility, a \$13 million Military Construction project.

As FY04 opens, the nation continues to be concerned about chemical and biological weapons. The course of events to date in Iraq and the growing ferocity of terrorist activity will almost certainly result in challenges for ECBC in the coming year. I am confident we will respond to these challenges as we have so many times in the Center's history, providing equipment, technical solutions and vital information when and where they are needed.

I am grateful for the contributions of time, energy and talent by the ECBC workforce, and for the continued confidence, support and investment of our diverse customer base. I am especially thankful to the ECBC personnel who have deployed to locations around the world to provide on-site expertise in the global war on terrorism. It is the combined strength of these employees and customers that has enabled ECBC to be the leading chemical and biological defense resource for our nation's defenders.

Sincerely,

A handwritten signature in black ink, appearing to read "J. Zarzycki".

Jim Zarzycki
Technical Director

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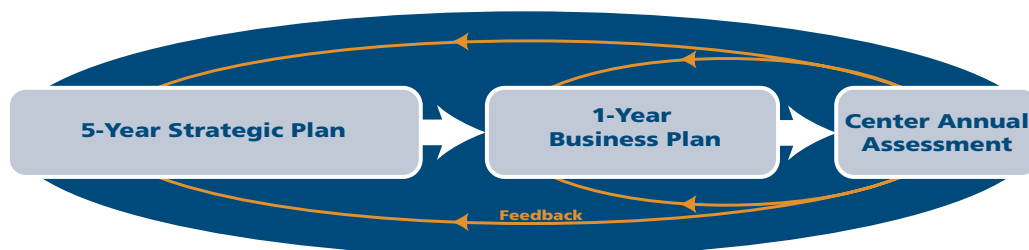
Introduction

The Edgewood Chemical Biological Center (ECBC) is a U.S. Army research, development and engineering facility dedicated to non-medical chemical and biological defense. The Center has a mission to protect our warfighters and U.S. interests through the application of chemical and biological defense science, technology and engineering. ECBC's capabilities range from novel laboratory research and technology development to engineering and field services. These capabilities include expertise in chem-bio agent handling and analytical services, driven by personnel with a diversity of specialties.

Since 1917, ECBC's specialized staff has outfitted the nation's warfighters with the most technologically advanced chemical biological detection, protection and decontamination equipment. Now, with new threats facing our homeland, ECBC continues to serve the warfighter as well as answer the call of our nation's leaders for chemical and biological defense at home. ECBC currently supports all services within the Department of Defense and an extensive domestic client base to include almost all federal agencies. The Center provides acquisition support to the Program Management community and often deploys scientists, engineers and technicians along with the nation's warfighters to provide hands-on field support. The Center is a partner with industry, academia, and our international allies.

Strategic Planning Process

The Annual Report is a critical component of our business and strategic planning cycle. ECBC's strategic planning process ensures a thorough examination of our external operating environment in accordance with the Government Performance Review Act. It was this assessment in 1999 that focused the Center on responding to the threat of domestic terrorism and enabled ECBC to make domestic contributions well in advance of 9-11. ECBC's strategic planning process includes a multi-year strategic plan, annual business plans, and an annual assessment of the Center's performance against the business plan. This assessment takes form in the ECBC Annual Report.



ECBC's strategic and business planning efforts were recognized in a General Accounting Office (GAO) report, GAO/NSIAD-99-159, Chemical and Biological Defense: Program Planning and Evaluation Should Follow Results Act Framework dated August 16, 1999, which stated the following: the Center "is the only RDT&E organization to systematically apply Results Act principles" and the "strategic plan is driven by and linked with the overarching planning architectures of DoD, the Army, and the Army Materiel Command." Further, our "strategic planning model directly links the attainment of its vision with the development of goals and enabling strategies - followed by the execution of the strategies and measurement of performance..."

ECBC's 2003 Annual Report

This Annual Report highlights ECBC's FY03 contributions to chemical biological defense. The first section, Highlighted Technologies, spotlights a selection of ECBC projects and technologies that supported strategic goals and transitioned or made a similarly valuable contribution to our nation during FY03.

The poster insert in this document details our activities in support of the Global War on Terror (GWOT) before, during and after the conflict. The poster also details our contributions to the Joint Program Executive Office for Chemical and Biological Defense, a key ECBC customer who fielded improved chem-bio defense products to the warfighter for Operation Iraqi Freedom.

The Report on Resources section includes FY03 information on our key resources, including personnel and specialized facilities. Also included in this section is financial data and information on important partnerships.

Mission

ECBC will protect the warfighter and U.S. interests through the application of science, technology and engineering in chemical and biological defense.

Vision

To be the nation's source for chemical and biological defense research, development and acquisition to support the warfighter and other national interests.

Goals

- 1. An exceptional workforce that is optimized to meet the changing needs of our customers**
- 2. The application of the best science, technology and engineering for our customers**
- 3. State of the art equipment and facilities that are safe for workers and the environment**

M12A1

In FY03, ECBC designed,
implemented and deployed
the improved M12A1
decontamination system
to the Persian Gulf region.



By the midpoint of FY03, the nation was preparing for war and ECBC was at the ready to support military activities in the Persian Gulf region. A short-fuse request for updated decontamination equipment demanded an upgrade of the M12 Decontamination System to make it more reliable, easier to operate and maintain, and more efficient. ECBC engineers redesigned the large-area decontamination system, now known as the M12A1, to meet today's battlefield requirements. ECBC, in partnership with Pine Bluff Arsenal and the SBCCOM Integrated Materiel Management Center (now Tank Automotive and Armaments Command Soldier Biological Chemical Operations Directorate), completed the retrofit and deployed an initial quantity of 56 units to the Gulf within six months of the Pentagon's request. Normally, such a project requires up to several years. To date, 136 M12A1 units have been deployed around the world.

Focus on... **ENGINEERING SERVICES**



ECBC has a full service, hands-on engineering capability staffed by subject matter experts from a range of disciplines including computer-aided design and engineering, prototyping, and fabrication. This allows ECBC not only to bring new products quickly to the warfighter, but also to redesign existing devices to achieve better performance for soldiers in the field. In FY03, ECBC designed, fabricated and installed Portal Shield systems for use in the Middle East, conducted testing and evaluation in support of the National Guard Analytical Laboratory System prove-out, and provided significant readiness and fit support to the M40 and M42 mask teams.

Modeling, design and analysis, prototyping, test and evaluation, technical data documentation and manufacturing services are all the components of start-to-finish deliverables. By evaluating production possibilities and design issues virtually, engineers can help manufacturers foresee developmental limitations and reduce development time as well as production costs. Advanced rapid prototyping and computer-aided manufacturing technologies drastically reduce the pilot production timetable, allowing new products to go directly from computer screen to actual working models.

Engineering service assets include 200,000 square feet of laboratory, development, testing and evaluation space stocked with an extensive inventory of the latest equipment. A staff of 100 engineers, scientists, technicians, specialists, and craftsmen provide engineering and acquisition cycle support driven by performance, schedule, and cost commitments.

Chemical Treatment TECHNOLOGIES

A revised destruction process engineered by ECBC allowed the Aberdeen Chemical Disposal Facility (ABCDF) to begin accelerated operations in FY03.





While the chemical weapons stockpile in storage at the Edgewood Area of Aberdeen Proving Ground was already slated for destruction within the current decade, the schedule for its disposal was significantly accelerated during 2002 in order to eliminate the vulnerability for the Army and the region as a whole. In FY03, drawing from its experience in receiving and transferring chemical agents at its Chemical Transfer

Facility, ECBC lent its expertise to the team heading up the disposal project at Aberdeen to revise the process, re-engineer the equipment, provide validation and acceptance testing and conduct training for equipment operators for the new system. Full-scale operations began in April 2003 and will continue until the chemical agent is destroyed and the 1,815 one-ton containers are treated, cleaned, and cut in half in preparation for recycling. The accelerated schedule will save two years and more than \$150 million. ECBC continues to provide personnel to support the operation and continuously improve plant procedures and equipment.

Focus on... **CHEMICAL BIOLOGICAL DEFENSE SUPPORT SERVICES**

Many customers from the Department of Defense turn to ECBC as their preferred source for chemical and biological agent handling, monitoring, assessment, field operations and risk reduction expertise. The Center's client list includes the Office of the Secretary of Defense, the Department of Homeland Security, the Department of the Army and the Army Materiel Command. During FY03, ECBC provided these groups and a host of others, including members of the intelligence community and other government entities, with specialized chemical surety and biological materiel management services. The agent handling skills resident at ECBC also allow the Center to serve as the United States' Single Small Scale Facility under the international Chemical Weapons Convention. In this role, ECBC is the nation's only location for storage and management of research quantities of chemical agents.

The capabilities that made the Center a critical resource for the chemical weapons stockpile disposal project in FY03 positioned the Center to assist the Army Program Manager for Non-Stockpile Chemical Destruction and the Deputy Secretary of the Army for Installations and Environment in testing the Explosive Disposal System and other promising destruction technologies. ECBC's participation in these initiatives will contribute to the fielding of a portable device to safely contain and render safe unexploded chemical ordnance found at military bases and elsewhere.

Inhalation Toxicology **LOW-LEVEL EFFECTS**

ECBC's low-level toxicology efforts provided a basis for operational decision support to Operation Iraqi Freedom in FY03.





Accurate toxicological data is essential when conducting health hazard analyses, establishing materiel requirements and solving decontamination challenges. ECBC's low-level toxicology research will fill data gaps relating to exposure to airborne chemical warfare agents to enable better predictions of agent impact on personnel, enhance risk assessment modeling tools and define which detection thresholds are physiologically relevant.

In FY03, ECBC continued its low-level operational toxicology research studies in support of Defense Technology Objective CB.51 and published precedent setting data that transitioned to both military and civilian risk assessment applications. Demonstrating situations when commonly held standards for agent exposure do not apply, ECBC developed new equations that more accurately predict chemical agent effects. The breakthrough research modeled the relationship between chemical nerve agent Sarin (GB) vapor exposure concentration and duration in determining the probability of miosis, or constriction of the pupil of the eye, developing as the "first noticeable effect" in an exposed population.

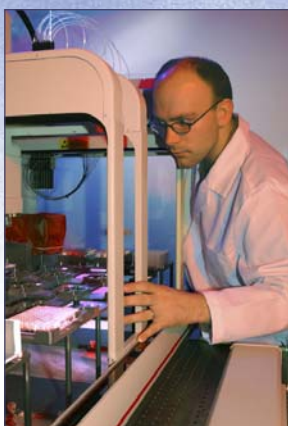
Focus on... **BIOTECHNOLOGY**

Recognizing biotechnology as a critical path to the future, ECBC initiated construction of a current Good Manufacturing Practice (cGMP) facility in FY03 that ultimately will expand the Center's biotech production capabilities to include items for human consumption. This additional infrastructure fills a real need—cGMP-certified labs, necessary for later stages of biotechnology testing, are limited in number and capacity—and will bring forward the next generation of soldier performance, protection and monitoring products. ECBC continued to participate heavily in advanced research projects throughout FY03 at its Process Engineering Facility and through engagements with groups including the NATO Advanced Research Workshop on Toxicogenomics and Proteomics. Within the Army, ECBC's biotech experts initiated the new RDECOM Biotechnology Working Group and organized two Army Materiel Command (AMC) biotechnology roundtables.

The Automated Biological Agent Testing System (ABATS)

From concept to construction in twelve months—ABATS was validated and deployed during FY03. The system is evolving to a mobile platform known as Stations of Robotic Monitoring, or STORM.





In early FY02, ECBC and the Joint Program Executive Office for Chemical and Biological Defense initiated a fast-track program to develop and field a high throughput robotic system to screen environmental samples for biological warfare agents. The resulting device, known as ABATS, automated real-time polymerase chain reaction and immunoassays for the analysis of a wide variety of environmental samples, including air, food, mail and soil. ABATS recently was named one of the Army Materiel Command's Top Ten Inventions for 2002.

Following assembly and final method development in FY03, the ABATS was formally validated by the National Assessment Group, an organization that evaluates national Department of Defense programs. The findings demonstrated improvements in sensitivity and accuracy delivered by ABATS when compared to a manual approach, and showed a 33 percent reduction in analytical costs and a tripling in throughput versus manual approaches. The team responsible for the automated system is awaiting receipt of a patent and has generated two journal articles with a third manuscript in preparation.

Also during FY03, the ABATS concept evolved into the Stations of Robotic Monitoring system (STORM), a mobile platform high-throughput biomonitoring laboratory. The STORM laboratory, which uses components and processes proven by the success of ABATS, will be installed into a Joint Service Installation Preparedness Program (JSIPP) site for assessment as part of a broad-reaching environmental monitoring program. Another application of the STORM concept is being constructed for ECBC for use in serving special clients.

Focus on...

SAMPLING and ANALYSIS

ECBC is recognized as one of the nation's leading resources for sampling and analysis of unknown substances, and the increased awareness of the CB threat is spurring a flood of requests for information and assistance from the EPA, FBI, and other domestic agencies. The unique ECBC "unknowns" triage protocol allows safe processing and analysis of a wide range of unidentified chemical, biological, radiological, and explosive samples. In preparation for Operation Iraqi Freedom, ECBC scientists and engineers built four mobile laboratories for use in theater and deployed expert staff to support them. These labs coupled the latest technology with sophisticated engineering controls, portability and ruggedness that allowed continuous operation in the extremely harsh Iraqi desert environment. By delivering laboratory capabilities to the site, the logistical burden of transporting a potentially dangerous sample to the United States were minimized and, because the analysis rendered on-site was highly reliable, the combatant commanders were given actionable information in a timely manner. Samples that required more sophisticated analysis not currently possible in the field were referred to one of several "gold standard" laboratories in the United States, including ECBC's Chemical Biological Forensic Analytical Center at Edgewood.

Military Base READINESS

In FY03, ECBC helped prepare the military for action in CB-contaminated environments through WMD Installation Preparedness exercises in Cuba and Pearl Harbor.



ECBC conducted the Installation Preparedness program during FY03 at eight Navy locations including Naval Station Pearl Harbor, Naval Station Guantanamo Bay, COMNAVMARIANAS Guam and Naval Submarine Base Kings Bay, Georgia. This program provides installations with the tools to minimize the impact of a chemical, biological, and radiological WMD attack on a key military center or point of debarkation. The new Joint Services Installation Pilot Project, or JSIPP, is based on the framework of ECBC's WMD Installation Preparedness program.

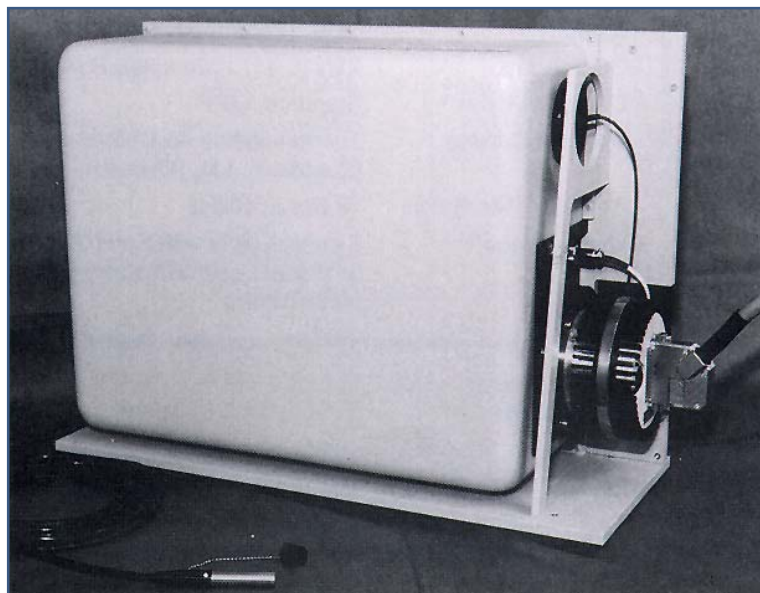
Also in FY03, ECBC provided the RestOps Information Management (ROIM) system to a number of CONUS and OCONUS military installations. ROIM is based on the Restoration of Operations, or RestOps, Advanced Concept Technology Demonstration conducted during FY02 that demonstrated a system of actions and technologies designed to quickly restore operations at fixed military points of debarkation, such as ports or airfields, following a chemical or biological attack. Collectively, ECBC, the Air Force Research Laboratory and the Defense Threat Reduction Agency are the source of the technology for this project, which greatly mitigates the operational impact of attacks on a military base. It includes installation of a Geographic Information System (GIS) that provides a complete base-wide situational awareness picture of both CB and non-CB events that affect the base's ability to survive, mitigate and recover from a CB attack. Incorporated into the system are live real-time CB sensor integration, facility management, sweep management, event management and hazard prediction.



With its long experience in CB response baselining, assessment and training, ECBC was able to evaluate the readiness of major military bases for deployment following an attack using chemical or biological agents.

Raman SPECTROSCOPY

In FY03, ECBC demonstrated the ability of instruments utilizing Raman spectroscopy to detect and identify chemical agents on surfaces.



In FY03, ECBC and ITT Industries participated in a successful test of Raman spectroscopy technology in support of PM Contamination Avoidance. Cooperating ECBC and ITT researchers measured the UV Raman spectra of both traditional blister and nerve chemical agents and non-traditional agents, including some 30 compounds and simulants. The ongoing effort to measure Raman signatures of chemical agents, non-threat agents, simulants and typical interferents will eventually lead to a reference library of Raman signatures. ECBC will be able to load this information into detection devices that use Raman spectra and more accurately identify and discriminate specific chemical agents from a short distance.

Under the leadership of Dr. Steven Christesen, ECBC has dedicated 20 years of research to this promising detection technology. Raman spectroscopy uses molecular light scattering phenomena to selectively detect the presence of chemical agents by way of spectral fingerprinting. Substances have unique Raman signatures resulting from differences in their chemical structures; for example, clear plastic has a distinct signature that is very different from the signature of asphalt, or any other substance. Chemical agents have a unique signature as well, and this signature can provide a way to remotely detect and identify the presence of agent. In collaboration with ITT and Brookhaven National Laboratory, ECBC recently demonstrated the ability of Raman spectroscopy to detect and identify chemicals on surfaces.

The Joint Service Contaminated Surface Detector (JSCSD) is a detector concept that applies Raman spectroscopy to short-range standoff detection. The JSCSD uses a laser to illuminate a surface contaminated with agent. The light is reflected by the agent back to the JSCSD where the pattern is received, separated, analyzed, and processed into a chemical fingerprint, and compared against a database of known Raman signatures. The results of this comparison will identify the agent.

Devices utilizing Raman spectroscopy are able to assess liquids, gases, solids and aerosols, are not distracted by water in either liquid or vapor form, and enjoy negligible variations in signatures or signal strength regardless of surface texture or reflectivity.



ECBC and ITT Industries conducted field tests on a Raman spectroscopy-based system at Dugway Proving Ground under the auspices of PM Contamination Avoidance. The system was mounted on a HMMWV platform.

Using Raman signatures, ECBC may be able to create detection devices that can identify specific chemical agents from a distance, regardless of their physical form or the characteristics of the surface they contaminate.

Receipt of Highly Toxic UNCHARACTERIZED SAMPLES

ECBC received, characterized
and assessed numerous unknown
and dangerous samples from
CENTCOM and the federal law
enforcement community in FY03.





As the United States grapples with the increasing threat of chemical, biological, and radiological weapons and explosively configured devices containing these materials, ECBC has emerged as the nation's resource for receipt, triage, sampling and screening of all uncharacterized samples, or unknowns, coming from military theaters of operation, law enforcement agencies and intelligence organizations. ECBC has the personnel and equipment to safely process and assess toxic chemical agents, microbiological agents, biological toxins, radioactive materials, energetic materials, and explosive devices. In addition, the Center uses non-invasive interrogation techniques as well as practices like remote drilling and draining to evaluate terrorist-configured weapons of mass destruction. ECBC also can rapidly assess "dirty bombs" and utilize its advances in robotic high-throughput screening for safe processing of biological agents.

During FY03, ECBC received a wide variety of unknowns from CENTCOM, the law enforcement community and other federal agencies that needed rapid characterization of mixed hazard samples. These samples were quickly assessed and then analyzed for chemical agents, biological agents, radioactive materials and energetic materials. In some cases, samples were first sterilized using ECBC's 28,000-Curie gamma irradiator while in other scenarios the samples were processed in a custom-designed Class III biological safety cabinet. In all cases, the samples were successfully analyzed in an efficient manner while maintaining the highest standards of safety, health and environmental compliance.

Also in FY03, ECBC began the process of constructing a critical new asset at the Edgewood campus: the Chemical Biological Radiological Sample Receipt Facility. The Sample Receipt Facility represents the future of unknowns triage and screening at ECBC. The \$13 million Military Construction-Army project began the design phase during FY03, and is proceeding with the support and encouragement of the FBI, the Defense Intelligence Agency, U.S. Special Operations Command and U.S. Central Command.



ECBC's experienced laboratory personnel and state-of-the-art analytical equipment have placed the Center in a unique position to receive, assess and analyze any samples potentially containing mixed hazardous materials.

Regenerative FILTRATION

During FY03, ECBC introduced a novel self-sustaining filter system that may revolutionize protection for fixed and mobile assets.

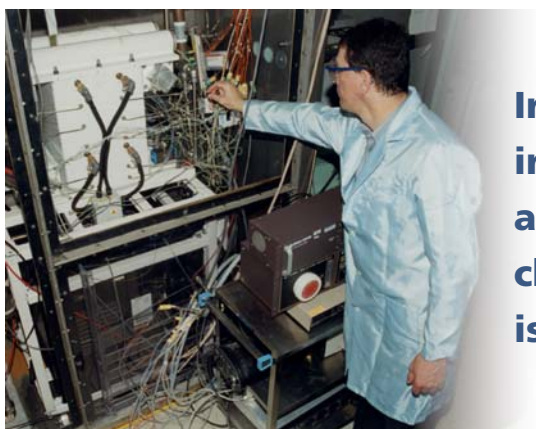




Through a cooperative research and development agreement, ECBC is collaborating with domnick hunter group, a leading international filtration firm, on a regenerative filtration technology program. The system, designed to protect against biological and chemical agents as well as toxic industrial chemicals, uses a set of regenerative filter beds that do not need to be changed regularly.

Using high temperature and low pressure, one filter bed is purged and cleaned while the other continues to filter, eliminating the need for downtime and filter change. Due to low maintenance requirements and high adaptability, this technology can be installed in shelters, buildings, vehicles, ships or anywhere protection against chemical or biological warfare agents is required. During FY03, this promising technology underwent a testing phase and was demonstrated at ECBC as a completely modular, scalable and multi-purpose system concept.

The ECBC regenerative filtration system is being considered for inclusion in the manned variant of the Future Combat Systems, a Defense Advanced Research Project Agency tactical technology initiative.



Innovation and partnership go hand in hand at ECBC, and research for advancing the state of the art in chemical and biological filtration is no exception.

Support to the **UNITED STATES POSTAL SERVICE**

In FY03, ECBC and the United States Postal Service developed processes and practices to reduce the exposure of USPS personnel and the public to biological weapons sent through the mail.





Dr. Ed Stuebing, leader of ECBC's Aerosol Sciences Team, confers with Bob Doherty (seated), who led the ECBC team that performed the USPS project.

Immediately following the anthrax attacks of late 2001, the USPS called upon ECBC for its expertise in detection of weaponized biological agents. Since then, ECBC has designed and performed a series of rapid response experiments involving candidate USPS automated mail processing systems and handling envelopes containing biological spores. The experiments were conducted in ECBC's 70-cubic-meter aerosol test chamber by a group of ECBC and USPS personnel working side by side under the direction of a Postal Service test manager. In FY03, this project became the primary down-select trial in which various air and surface sampling devices and identification technologies were surveyed, ultimately resulting in the technology concept currently being deployed to mail handling facilities across the nation.

Focus on... **AEROSOL SCIENCES EXPERTISE**

The Army's smoke and obscurants and biodetection missions depend heavily on ECBC's aerosol sciences resources. Under the direction of Dr. Ed Stuebing, a world leader in aerosol science, ECBC leveraged its expertise and infrastructure against these missions during FY03. ECBC has an impressive array of equipment, including a 70-cubic-meter test chamber, which was used to conduct the USPS mail processing tests in FY03; wind tunnels that create various airspeed conditions for evaluating the aerodynamic properties of developmental items such as aerosol collectors and airborne obscurants; and the Stealth Tube, a 40-foot-long device that allows outdoor testing of Light Detection and Ranging (LIDAR)-based standoff detection systems against controlled amounts of fully-characterized biological simulants.

A focal point of ECBC research in this field during FY03 was on improving biological point detection systems to broaden the scope of possible applications. Many current biological samplers—such as those used by the EPA to monitor air quality around the country—depend on aerosol collectors that cannot handle the high wind speeds encountered while mounted on a mobile platform. In addition, drawing air into the collectors in proper volumes for sampling requires a substantial amount of power, which in turn demands a cumbersome power supply system. ECBC personnel labored over subtle improvements in aerodynamics and other technologies to reduce the power needed to process large volumes of air and to improve the ability of collectors to tolerate higher air speeds.

Vaporized HYDROGEN PEROXIDE

In partnership with STERIS Corporation, ECBC demonstrated the efficacy of Vaporized Hydrogen Peroxide as a chemical and biological decontaminant during FY03.



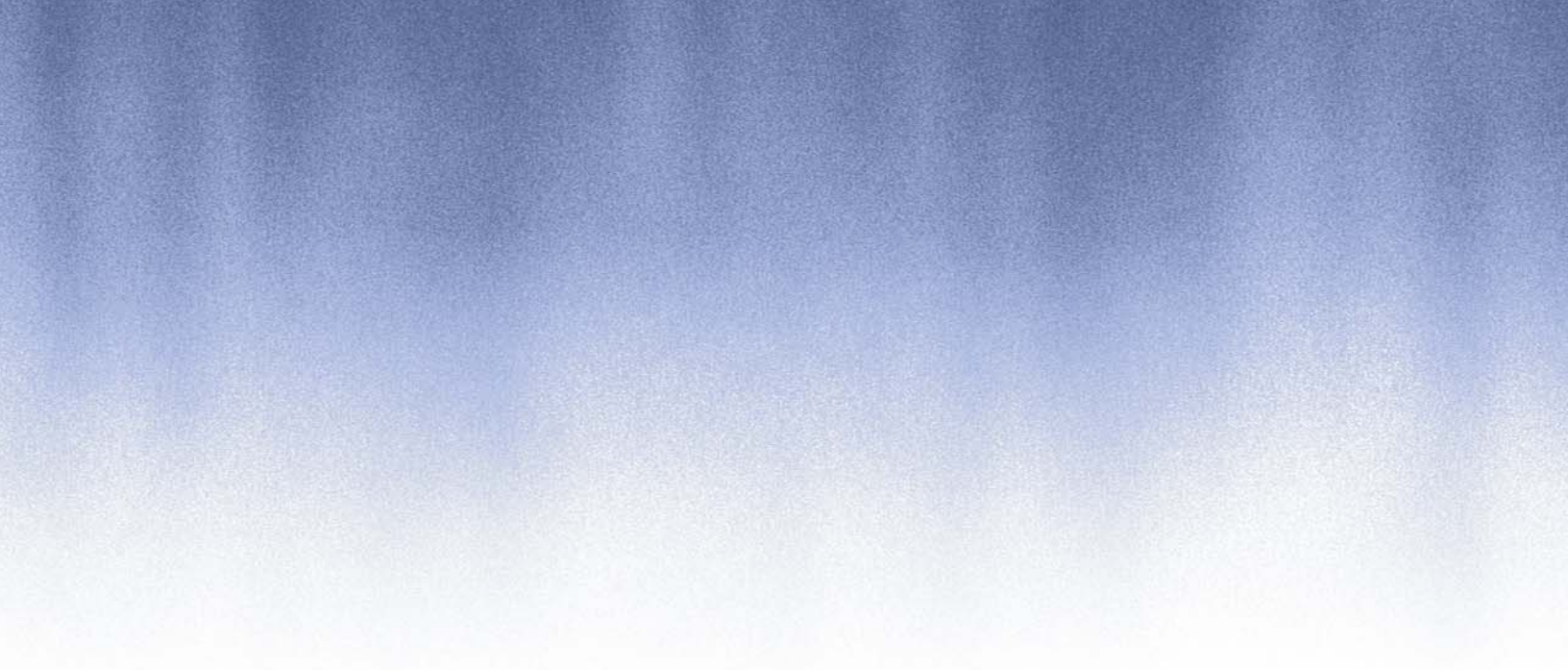
In FY03, ECBC partnered with STERIS Corporation to adapt their Vaporized Hydrogen Peroxide (VHP) technology for use as a military decontamination system. ECBC took this patented medical sterilization system and applied its knowledge of chemical decontamination technologies to modify the VHP formula and develop a process for addressing both chemical and biological threats. The FY03 effort demonstrated the efficacy of the VHP system for decontamination of chemical warfare agents by fumigation.

The VHP-based system constitutes a real breakthrough for decontamination systems due to its equipment- and environment-friendly nature and its scalability. VHP can return to service structures and equipment incorporating sensitive electronics, whereas existing decon technologies can damage such shelters and equipment, rendering them unusable. Current decon solutions are also caustic and harsh on the environment, while VHP leaves behind only non-toxic, natural byproducts. ECBC and STERIS are developing VHP with the goal of providing the U.S. military with a decontamination system that can be mobilized and applied in field situations, successfully clean the interiors of aircraft and high-value vehicles, and return such equipment to service. With its superior materials compatibility properties, VHP is likely to prove to be a leap forward in decontamination chemistries and delivery systems for both field operations and installation protection.

ECBC continues to optimize the VHP system and integrate it into systems transportable by standard military vehicles. One of these systems will be used to demonstrate decontamination of an actual aircraft interior in FY04, and a full-scale building decontamination exercise also will be executed at ECBC in FY04.



VHP could revolutionize the cleansing and return-to-service process for shelters and equipment contaminated by chemical or biological warfare agents both in the field and in homeland security.



REPORT ON RESOURCES

PEOPLE

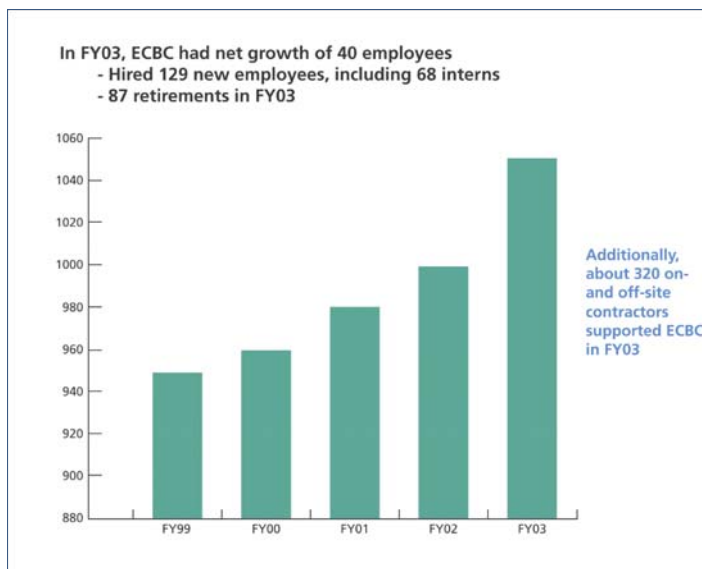
In FY03, ECBC added 129 employees and focused on personnel retention initiatives to maintain its valuable human capital.





For the fourth year in a row, ECBC countered the trend of declining critical government core competencies by hiring 129 new employees in FY03. This has endowed the workforce with a fresh perspective and specialized capabilities. In order to respond to the increased threat of biological weapons, emphasis was placed on hiring individuals specializing in the life sciences; however, hiring was distributed across all grade levels and competencies. The Center set the ambitious target of hiring 98 new staff members during FY03 and exceeded that target by more than 25 percent.

ECBC's focus on improving staff retention in FY03 took form in a comprehensive retention strategy, guided by a human resources steering committee and implemented by each of ECBC's four directorates. The focus is not simply on retaining people; it is on identifying and retaining the appropriate skill mix for ECBC to meet its mission and associated strategic goals. The strategy was developed using retention data from the personnel database and input from representatives of each directorate. It will serve as the foundation for future retention initiatives.



In FY03, ECBC also instituted its Performance Database Management System for managers, supervisors, and employees in order to more efficiently manage the performance appraisal process. This new automated program provides supervisors with notifications of employee's upcoming appraisals and mid point evaluations.

Leadership DEVELOPMENT

In FY03, ECBC fostered growth from within, encouraging collaboration among today's senior staff and bringing forward potential future leaders with its multi-faceted development program.





Several years ago, ECBC began focusing on Leadership Development as a core competency for its senior leaders and a necessary step in cultivating success and growth within ECBC. In FY03, ECBC realized many of its initial goals in this area and made tremendous progress in developing the next generation of technical and business leaders.

In addition to traditional leadership training methods, ECBC focused on three initiatives during FY03.

Leadership Consortium

The Consortium is comprised of ECBC's senior team leaders and business unit leaders. This group is responsible for structuring the Center's long-term goals and developing and implementing its business strategies.

Leadership Cohort

ECBC's Technical Director championed the Leadership Cohort concept to develop leadership skills in high performing GS-13 and GS-14 employees. Each Cohort typically consists of eight to ten individuals who are selected following a rigorous application process that evaluates past performance, attitude and competency. These potential new leaders gain perspective on global issues affecting the Center's future, obtain particular insight into the Technical Director's viewpoints and obtain direct experience in working with peers from a range of specialties.

Understudy Junior Scientists

Like other federal agencies, ECBC has experienced the loss of some of its scientists through retirements. In order to ensure the Center retains its knowledge base in CB defense, ECBC began a formal understudy program where junior scientists were teamed with their more senior colleagues. This program has helped ensure the survival of ECBC's core competencies, and has moved many talented junior scientists to positions of responsibility within their teams.

External Awards AND RECOGNITION

Again in FY03, numerous ECBC employees were recognized as leaders in their scientific fields and their projects were hailed as important advancements for our nation.



Army R&D Achievement Award

Received by ECBC's Biosensors and Molecular Engineering teams for their work on Real-Time Fluorogenic PCR Assays to Detect and Identify Biological Threat Agents

Federal Laboratory Consortium Award for Technology Transfer

Received for two ECBC activities: "Design, Development, Training, Fielding and Continued Consultation for Mobile Laboratories" and "Antibody Engineering for Expression in Insect Cells and Larvae." ECBC also received the 2002 FLC Laboratory of the Year award and the 2002 FLC Lab Director of the Year award in FY03



AMC Greatest Inventions Awards for 2002

The Army Materiel Command asked the Department of the Army Deputy Chief of Staff for Operations to evaluate the contributions made by Army labs for the warfighter. The operations staff evaluated a number of AMC inventions and selected 10 items to be named Best Inventions for 2002. The awards were based on impact on Army capabilities, potential benefits outside the Army and inventiveness.

Three of the 10 winning items were ECBC inventions: the Automated Biological Agent Testing System (ABATS), the Biological Attack Warning System (BAWS), and the Advanced Chemical-Biological Mask.

ABATS: Dr. Peter Emanuel, Isaac Fruchey

BAWS: Dr. Richard Smardzewski, David Sickenberger, Felix Reyes, Karen Vado

Advanced CB Mask: Corey Grove, Stephen Chase, William Fritch, Jr.



U.S. Junior Chamber's Ten Outstanding Young Americans (TOYA) Award for 2003

Received by ECBC's Dr. Peter Emanuel

David Packard Award for Excellence in Department of Defense Acquisition

Received by ECBC members of the Joint Service Family of Decontamination Systems (JSFDS)

team: Dr. John Weimaster, Robert Eckhaus, Bill Argiropoulos, Mike Lee, Gerald Dietz, Phillip Rankin and Richard Newton

2003 Excellence in Federal Career Awards, sponsored by the Federal Executive Board

Gold Winner: Dr. Kevin O'Connell

Silver Award Winner: Mr. Peter J. Schlitzkus

Bronze Award Winners: Ronnie L. Eckstein, Shawn Heinlein, Sharon E. Hoffman, Kathy P. Jenkins, Eva Mims, Horace W. Pearce, Dr. Vipin K. Rastogi

AMC Engineer of the Year for 2003

Received by ECBC's Dr. Mark Schlein



Technology TRANSFER

In FY03, ECBC initiated 50 partnerships with industry and academia and received several technology transfer awards, including Laboratory of the Year, from the Federal Laboratory Consortium.



In October, ECBC signed a Memorandum of Understanding with the EPA to help them meet their responsibilities for infrastructure protection. The Water Test Loop system shown above will provide a platform for testing and evaluation tasks associated with detection, verification, decontamination, and continuous monitoring.

ECBC has embraced the spirit and letter of the congressional directive to apply technologies from government laboratories to civilian and commercial applications. ECBC has experienced a 268 percent increase in technology transfer agreements originating at ECBC since 1999.

Partnerships with Private Industry. ECBC's success in establishing industry partnerships is evidence of the Center's reputation for excellence. Private industry can choose from any private or public facility when searching for collaborative partners, but many large and small companies opt to work with ECBC. The Center's success in establishing these partnerships demonstrates that its unique facilities, responsive staff and focus on customer satisfaction have made us the choice of some of the nation's leading corporations. For example, The Gillette Company, a Fortune 500 organization, selected ECBC to conduct an important toxicology validation study above other private and public laboratories certified to perform the work.

In FY03, ECBC initiated 15 Cooperative Research and Development Agreements (CRADA), 34 Technical Service Agreements (TSA), and one Patent License Agreement (PLA). Proceeds from such partnerships cover ECBC's costs and support maintenance and improvement to its technical infrastructure. ECBC's largest contributing partners in FY03 included Bechtel National, Battelle, Scott Health and Safety, Hunter Manufacturing, Smiths Detection, and 3M.

Interagency Partnerships. ECBC has been establishing important interagency partnerships with other federal organizations in the interest of furthering the nation's chemical and biological defense capabilities. Technologies being developed to protect soldiers on the battlefield were modified for use by other government agencies to enhance the security of private citizens.

AGENCY	PARTNERSHIP ACCOMPLISHMENTS IN FY03
Federal Bureau of Investigation	16th year under MOU, collaborated on anthrax investigation and forensic methods development
National Institutes of Health	Co-chaired the Alternatives to Animal Testing Conference, collaborating to validate research methods to reduce need for animal testing
Food and Drug Administration	Signed MOU to develop mobile laboratories
National Institute for Occupational Safety and Health (NIOSH) and the National Institute for Standards and Technology (NIST)	Developed chemical biological respiratory protection standards and test methodology
United States Department of Agriculture	Signed MOU to develop use of new detection and identification methodologies and emergency management procedures in the event of deliberate introductions of animal or plant pests or diseases
Environmental Protection Agency	Signed MOU to support critical infrastructure protection, participate in EPA Homeland Security Center
United States Postal Service	Completed work on anthrax in the mail
United States Secret Service	Entered second decade of support, conducted advanced filtration tests in FY03

FACILITIES

In FY03, ECBC broke ground for its new Advanced Chemistry Laboratory, advanced its plans for a new Chemical Biological Radiological Sample Receipt Facility, and augmented existing technical infrastructure.





U.S. Sen. Paul Sarbanes, D-Md., attended the ACL Groundbreaking.

High demand for ECBC's services enabled the Center to embark on several major infrastructure improvement projects at Edgewood in FY03.

In May of 2003 ECBC broke ground for the new **Advanced Chemistry Laboratory**, a Military Construction-Army project that represents a \$44 million investment in the Center. This was the only R&D facility construction project funded in the Army's five-year defense plan. The new 75,000-square-foot chemistry laboratory will enhance ECBC's ability to counter the evolving threat of chemical warfare and the use of chemical agents by terrorists. The Advanced Chemistry Laboratory will contain 23 agent laboratories, three Nuclear Magnetic Resonance suites, and a toxin suite with five work areas. These resources will be dedicated to working with chemical agents and toxins.

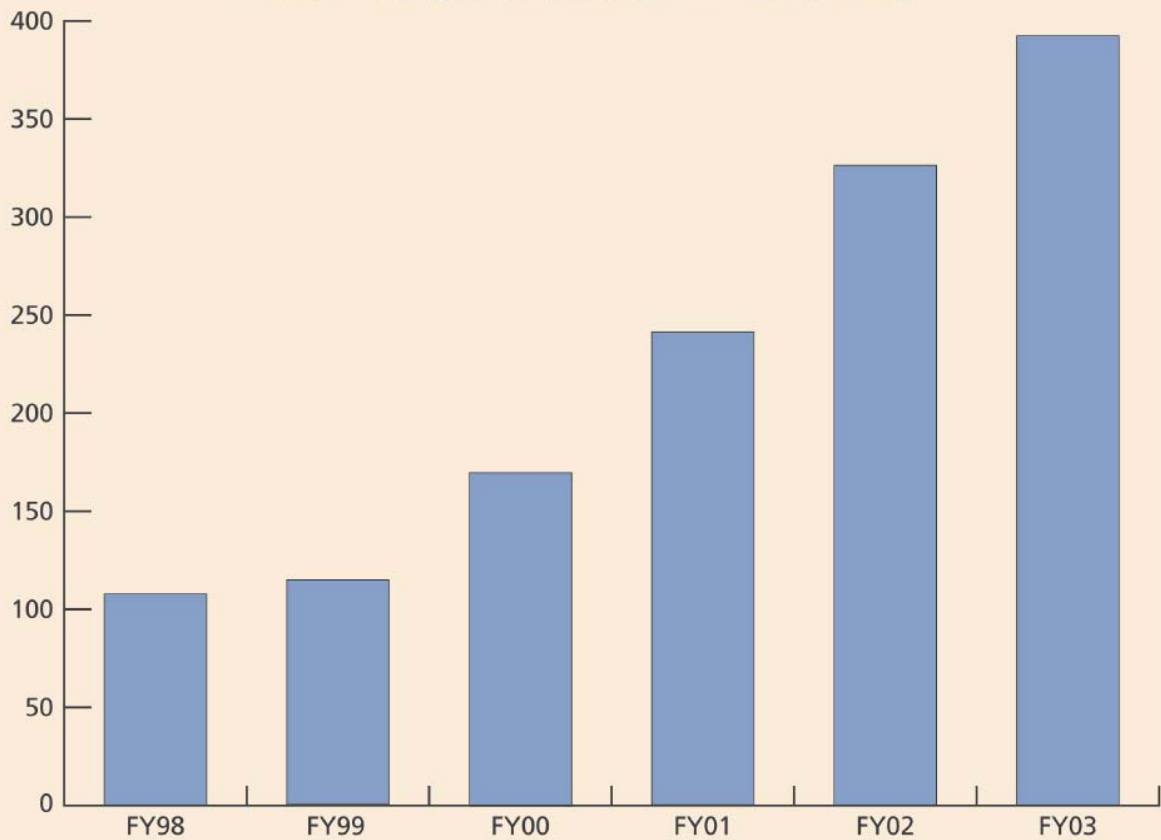
Another Military Construction-Army funded project is the **Chemical Biological Radiological Sample Receipt Facility**. With construction slated for FY06, the SRF will ensure ECBC retains its critical role as the U.S. single small scale facility under the Chemical Weapons Convention and the nation's resource for safe triage, assessment and handling of "unknowns," or unidentified chemical, biological and radiological samples and devices. U.S. Central Command (CENTCOM), U.S. Special Operations Command (SOCOM), the Defense Intelligence Agency (DIA) and the FBI all supported the need for this unique facility and encouraged its inclusion in the Army's MCA program, and the FBI and DIA are collaborating with ECBC on the facility's design.

In the testing and evaluation arena, ECBC initiated a project with the EPA and the Army Corps of Engineers in FY03 to design and construct the **Water Test Loop**, a system that simulates a potable water distribution system. This new infrastructure will provide a capability for challenging water monitoring, testing and decontamination tools. ECBC is also keeping a focus on biotechnology with its continued progress on the new **current Good Manufacturing Practices (cGMP)** facility and the second phase of the **Biological Safety Level 3 laboratory**. Both of these facilities have entered late stages of certification and will soon be added to ECBC's roster of unique capabilities.

Further strengthening ECBC's technical evaluation capabilities are improvements to the Filter Challenge Facility and the Point Detector Facility, the addition of the "Artemis" Stand-off Detection Chamber, the addition of new "SmartMan" respiratory protection challenge systems, and the construction of a new Aerosol Inhalation Chamber.

FINANCIALS

ECBC Revenue Trend FY98-03 (in Millions of Dollars)*



* No congressionally directed additions to the program included FY99-03

Over the past six years, ECBC has nearly quadrupled its funding, largely in the area of customer reimbursables. Much of this work comes from the increased need on the part of federal agencies for support in the area of homeland defense and security. ECBC is pleased to project a decrease in our overhead rate for FY04, which will benefit customers across the board.

Revenue (in Millions) ***FY03****ARMY FUNDING**

RDT&E	
Basic Research ¹	1.8
Exploratory Development ²	3.3
Advanced Development ³	0.8
Demonstration and Validation ⁴	4.1
Management and Support / SBIR ⁵	5.2
ARMY OMA⁶	21.7
TOTAL ARMY FUNDING	36.9

DoD MISSION FUNDING

CHEM-BIO DEFENSE PROGRAM	
Basic Research	5.6
Applied Research ⁷	64.9
Advanced Technology Development ⁸	24.9
Management and Support	3.0
JPEO ⁹	54.0
DTRA ¹⁰	7.4
DARPA	1.9
CMA ¹¹	29.4
Army PMs, PEOs ¹²	6.2
Procurement ¹³	2.5
TOTAL DoD MISSION FUNDING	199.8

OTHER DoD FUNDING

DoD, DA, Other Army ¹⁴	50.5
Intel Community	11.9
Navy ¹⁵	4.9
Air Force ¹⁶	3.1
Marines ¹⁷	32.9
TOTAL OTHER DoD FUNDING	103.3

Non-DoD FUNDING

Other Federal Agencies ¹⁸	30.6
Commercial Accounts ¹⁹	12.0
TOTAL NON-DoD FUNDING	42.6
GRAND TOTAL ALL FUNDING	382.5

* No congressionally directed additions to the program included

NOTES:

¹In-House Laboratory Independent Research (ILIR) projects

²Army Smoke & Obscurants Program

³Sustainable Painting Operations Total Army support (SPOTA), an Army Environmental Quality Technology program designed to ensure continued operations at Army facilities

⁴Support to the Donovan Transportable Detonation Chamber evaluation

⁵Management Support and Small Business Innovative Research (SBIR)

⁶Industrial Base, Contractor Logistics Support, sustainment activities. Fielded people, deployed mobile analytical equipment, and conducted samples receipt and analysis in support of the Global War on Terrorism (GWOT)

⁷Includes research activities in support of detection, protection, and decontamination. Many of the projects in this area in FY03 were related to development of chemical and biological detectors or sensors. Includes funding for DoD Defense Technology Objectives (DTOs)

⁸Modifications to existing lightweight detection systems, preparation for transition of fighterbase and casualty modules of Joint Operations Effects Federation (JOEF) program to support Block 1 Demonstration of software. Transition VLSTRACK Version 4 capabilities to the JEM Block 1 and JOEF programs

⁹Support to Joint Program Executive Officer and PMNBC with matrix personnel, projects, contracts

¹⁰Counterproliferation program

¹¹Matrix Personnel and testing and evaluation support for destruction of chemical agents

¹²Projects for PEO Ground Combat System, PEO Soldier, PM Mortars, PM Soldier Sensors & Equipment, PM Abrams, PM Soldier Warrior, PM Soldier Systems, PM Clothing and Individual Equipment, and PM Comanche

¹³M49 Filter and Filter Surveillance used in collective protection shelters and fixed site laboratories

¹⁴Support to HQDA in the area of Domestic Preparedness, USACE in a homeland security project, and Natick Soldier Center

¹⁵Support to Naval Surface Warfare Center and Navy Engineer Logistics Office in area of Installation Preparedness

¹⁶Installation Preparedness support

¹⁷Installation Preparedness support

¹⁸Includes support to DOJ, EPA, CDC, USDA, DOS, NASA, DOT, in homeland defense; and NIST/NIOSH in standards development

¹⁹Primarily Test Service Agreements (TSAs)

Congressional Adds: ECBC managed over \$69 million in Congressional Adds in FY03. These federally-approved funds largely passed through ECBC to university and commercial partners.

LOOKING FORWARD...

A CONSTANT MISSION; AN AGILE ORGANIZATION

ECBC is responsive to swiftly changing technological and requirements environments. Chemical warfare technology was at a basic level at our organization's start in 1917, while today's chemical and biological threats are sophisticated and widespread. Agility and responsiveness are essential ingredients to ECBC's continued leadership and success in chemical biological defense. The Center constantly evaluates and optimizes its infrastructure and human resources to stay abreast of the changing needs of the warfighter.

While ECBC's mission to protect the warfighter and U.S. interests through the application of science, technology and engineering to chemical biological defense remains constant, the Center exists in a rapidly changing world. In FY04 ECBC will need to be more responsive than ever to keep pace with the demands of the warfighter and the large-scale overhaul of its command structure and the Chemical Biological Defense Program (CBDP). ECBC has reporting responsibility within both of these organizational structures.

On October 9, 2003, ECBC officially became part of a new family of RD&E centers organized under the Army's Research Development and Engineering Command (RDECOM). This Command is responsible for developing integrated technology solutions for the Army, which includes chemical and biological solutions.

FY04 will be ECBC's first full year of operation under the new CBDP management structure. This structure, established by the Assistant Secretary of Defense for Acquisition Logistics and Technology, changes the way the chemical biological program is managed and funded.

A Joint Requirements Office (JRO) now oversees the requirements process. The Joint Program Executive Office (JPEO) for Chemical and Biological Defense directs the development and fielding of all CB defense equipment, both medical and non-medical. The Defense Threat Reduction Agency (DTRA) now manages the science and technology and technology demonstration programs, and is responsible for the CBDP funds management process. These new structures have the potential to positively impact the chemical and biological defense community, and ECBC will adjust its working relationships and business processes accordingly.

ECBC has flourished over the years by finding opportunity within change. There are a number of opportunities ahead in FY04:

- Collaborate with new RDECOM elements to bring greater integration to chemical and biological products and services within the Army
- Utilize our expertise in chemistry and biology—particularly biotechnology—to advance Army science and technology
- Transition more chemical and biological technologies out of the lab and into the hands of the warfighters
- Expand our services for our nation's homeland defense
- Strengthen key partnerships with federal agencies and potential collaborators involved in chemical and biological homeland security
- Add to our staff and strengthen our core competencies
- Realize important improvements to ECBC infrastructure

An organization with as critical a mission as ECBC's cannot remain focused on today's tasks but must look to the horizon. With a constant mission and an agile organization, ECBC is prepared to keep pace with the evolving needs of the nation's defense while remaining focused on its strengths.



For more information about
Edgewood Chemical Biological Center,
check out our Web site at:
<http://www.ecbc.army.mil>

Part of the U.S. Army Research,
Development and Engineering Command
(Provisional)



ECBC Answers the Call in FY03

In FY03, our armed forces engaged in combat in Iraq, we continued the war on terror around the world, and federal, state and local agencies worked to improve our readiness at home. ECBC, as the lead DoD laboratory for non-medical chemical and biological defense, was able to support each of these missions and many more during this past fiscal year.

Fall 2002

The nation is engaged in diplomatic negotiations to prevent conflict in the Middle East.

The United Nations directed ECBC to provide training for its weapons inspectors. ECBC frequently lends its unique expertise in chemical and biological weapons of mass destruction to the U.N. and federal agencies that need to build capabilities in inspection and identification.

ECBC developed and certified sampling kits for use in the Middle East and readied a number of mobile laboratory units for deployment.

Winter 2003

With diplomatic initiatives unsuccessful, the nation is gearing up for military operations in Iraq.

In response to a quick-turnaround request, ECBC teamed with Pine Bluff Arsenal and the SBCCOM IMMC to retrofit the M12 large-area decontamination system to meet modern battlefield requirements. In record time, ECBC re-engineered and modified the system, now known as the M12A1, and deployed 56 units to the Middle East.

Following an order to accelerate destruction of the weapons stockpile, ECBC redesigned the chemical weapons disposal process at the Aberdeen Chemical Disposal Facility. Within six months, the new system and equipment was engineered, built, and validated.

Spring 2003

U.S. military forces are engaged in the conflict, preparing for the possible discovery or use of chemical and biological weapons.

ECBC's fly-away laboratories were deployed to the Middle East in support of Operation Iraqi Freedom and provided quick on-site analysis of suspected CB materials for U.S. forces in the field.

A unique ECBC-developed protocol for triage of assessment of highly dangerous and toxic "unknowns," including items potentially explosively configured and tainted with chemical, biological or radiological materials, was applied to CENTCOM operations and proved to be critical to the U.S. mission in Iraq.

Summer 2003

The United States is focused on nation building in Iraq and on strengthening its defenses at home.

By conducting workshops and training in WMD preparedness for federal agency executives, ECBC contributed to the nation's heightened level of awareness and preparation for potential attacks on critical assets in the homeland. ECBC also orchestrated a large-scale functional readiness exercise at Pearl Harbor.



Personnel from ECBC evaluated the Explosive Disposal System (EDS) and the Donovan Chamber, two systems created to destroy explosively configured chemical devices.

Relying on its extensive evaluation and training experience, ECBC conducted Installation Preparedness exercises at a number of U.S. military installations around the world and supported U.S. Navy installations during WMD training and exercises.

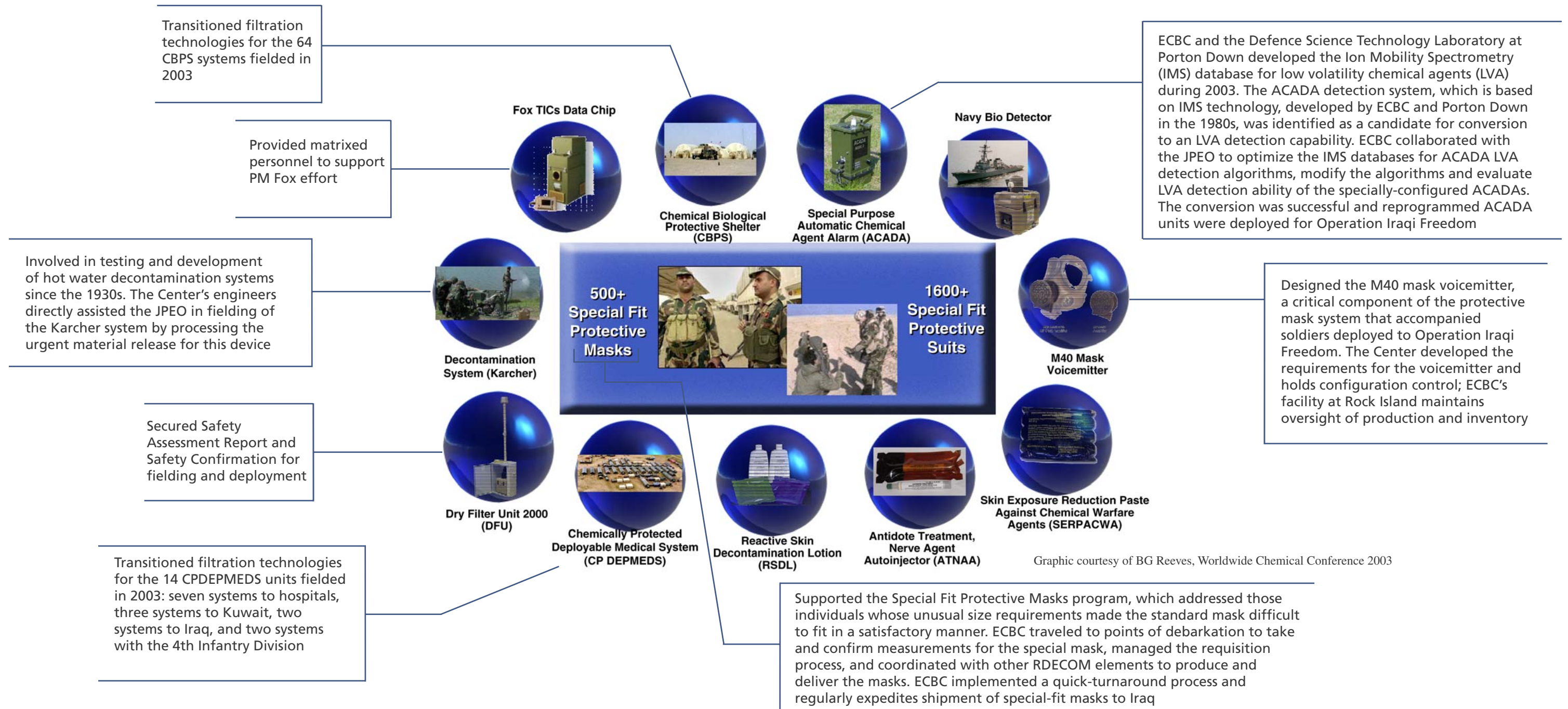
ECBC trained 60 Defense Threat Reduction Agency (DTRA) soldiers in the use of CB detection equipment, hasty decontamination practices and CB assessment techniques. The Center conducts similar training for Special Forces and Technical Escort Unit personnel on a quarterly basis.

The Center's chemical surety program successfully passed several stringent military inspections. Continued adherence to these standards ensured that CENTCOM and the intelligence community had seamless access to the ECBC surety services they depend on.

Several key partnerships between ECBC and federal agencies such as the Environmental Protection Agency and the Department of Homeland Security were initiated. The Center will provide expert consultation and collaboration in areas including monitoring and analysis and water supply safety.

Helping Others Succeed

ECBC is a critical partner of the Joint Program Executive Office for Chemical Biological Defense in transitioning products to the warfighter. With its expertise in chemical and biological protection, detection and decontamination technologies, ECBC was able to help Brigadier General Stephen V. Reeves be successful in his efforts to provide needed products and equipment to warfighters in Operation Iraqi Freedom. The Center's contributions to the eleven transitioned capabilities are noted below.



"Eleven new capabilities put in the hands of the warfighter for Operation Iraqi Freedom."

—BG Stephen V. Reeves
Joint Program Executive Office - Chemical Biological Defense